

### Amendments to the Claims

1-37. (Cancelled)

38. (New) A process for the production of chiral ligands comprising:  
providing as substrate a starting material of formula (A):

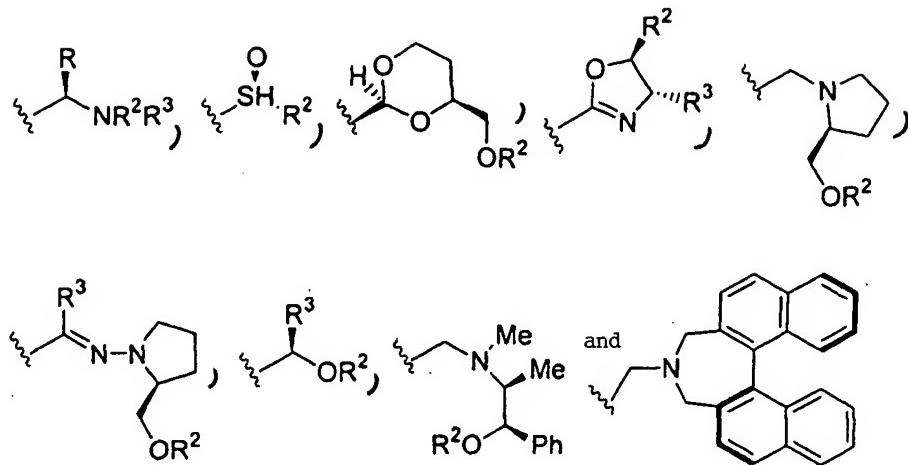


(A)

wherein X\* is a chiral ortho directing group; and wherein O is selected from the group consisting of an unsubstituted or substituted mono-aryl group, an unsubstituted or substituted polycyclic aryl group, an unsubstituted or substituted cycloalkyl group;  
comprising the steps of:

- a) ortho-lithiating the substrate;
- b) reacting the ortho-lithiated substrate with an R<sup>1</sup> substituted phosphine to form an intermediate compound;
- c) converting said ortho-lithiated compound to a compound having a phosphine group having the formula -PR<sup>1</sup>R<sup>1''</sup>, wherein R<sup>1</sup> and R<sup>1''</sup> are different from each other and independently selected from the group consisting of unsubstituted or substituted branched-chain alkyl, unsubstituted or substituted straight-chain alkyl, unsubstituted or substituted alkoxy, unsubstituted or substituted alkylamino, unsubstituted or substituted cycloalkyl, unsubstituted or substituted cycloalkoxy, unsubstituted or substituted cycloalkylamino, unsubstituted or substituted carbocyclic aryl, unsubstituted or substituted carbocyclic aryloxy, unsubstituted or substituted heteroaryl, unsubstituted or substituted heteroaryloxy, and unsubstituted or substituted carbocyclic arylamino.

39. (New) A process according to Claim 38, wherein X\* is selected from the group consisting of



wherein R, R<sup>2</sup>, and R<sup>3</sup> are independently selected from the group consisting of unsubstituted or substituted branched-chain alkyl, unsubstituted or substituted straight-chain alkyl, unsubstituted or substituted cycloalkyl, unsubstituted or substituted carbocyclic aryl, and unsubstituted or substituted heteroaryl.

40. (New) The process according to Claim 38, wherein O is a substituted or unsubstituted aromatic ring of a metallocene compound.

41. (New) The process according to Claim 38, comprising reacting the intermediate compound with an R<sup>1"</sup>-bearing Grignard reagent or organolithium compound.

42. (New) A chiral ligand produced by the process according to Claim 38.

43. (New) A transition metal complex catalyst comprising at least one chiral ligand produced according to the process of Claim 38.

44. (New) An asymmetric catalyst comprising the transition metal complex catalyst of Claim 43.